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EG/04/4

To Whom It May Concern

The Chief of the Patent Office certifies that Dr. Magd Ahmed Kotb Abdellah (**Address :** Building No. 5 , St No. 63 , Mokatam , Elhadapa Al-Olia , Cairo , Egypt) **has filed application No** 2003121103 on 23/12/2003 **to obtain a patent for an invention titled :**

" ELEMENTAL SULFUR AS AN ORAL OR PARENTRAL MEDICAL PRODUCT "

The inventor of this application is Dr. Magd Ahmed Kotb Abdellah

This Document had been given to Dr. Magd Ahmed Kotb Abdellah upon her request dated 03/04/2004

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Egyption patent office

Approved by :

Prof. Dr. Fawzi A. Elrefaie
April 11
2005
President,
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تليفون : ٧٩٢١٣٢٣ – ٧٩٢١٣٢٤ – ٧٩٢١٢٩١

مستند (2/3)

(2/3) الوصف المختصر باللغة الانجليزية لبراءة الاختراع/ نموذج المنفعة

Arab Republic of Egypt Ministry of State for Scientific Research and Technology Academy of Scientific Research and Technology Technology Development and Scientific Services Sector Egyptian Patent Office	EGYPT	(22) (21) (44) (45) (11)

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(30)	1. 2. 3.	
		(74)
براءة أصلية		(12)

Elemental Sulfur as an oral or parentral medical product

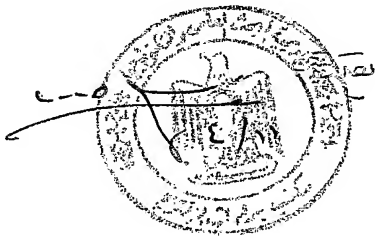
Elemental Sulfur and its acid addition salts and derivatives are physiologically acceptable, essential and are readily converted to acceptable counter parts by established procedures, they are pharmacologically active on the liver, lungs, hematopoetic system and all body systems and are thus useful when administered to warm blooded animals in terminating diseases associated with Glutathione S Transferase and Epoxide Hydrolase disorders. These compounds are prepared as elemental sulfur or as all acid addition sulfides, sulfites, sulphonates and acid addition hydrogen sulfides, sulfites, sulphonates, and base addition sulfides, sulfites, sulphonates and hydrogen sulfides, sulfites, sulphonates and derivative sulfide compounds, derivative sulfite compounds, derivative sulphonate compounds, and as sulfur compounds S_x-R_y compounds. They are simply elemental or compounded into different dosage – multi form medicament compositions. Plastic of sulfur and all acid addition sulfides, sulfites, sulphonates and acid addition hydrogen sulfides, sulfites, sulphonates and base addition sulfides, sulfites, sulphonates and hydrogen sulfides, sulfites, sulphonates, and as sulfur compounds S_x-R_y compounds, have well recognized physical properties profile that is suitable for the making of all medical interventional material.

This is translation for application No., 1103/2003 filed on 23/12/2003

(2) The full description

(1/2) Previous art:

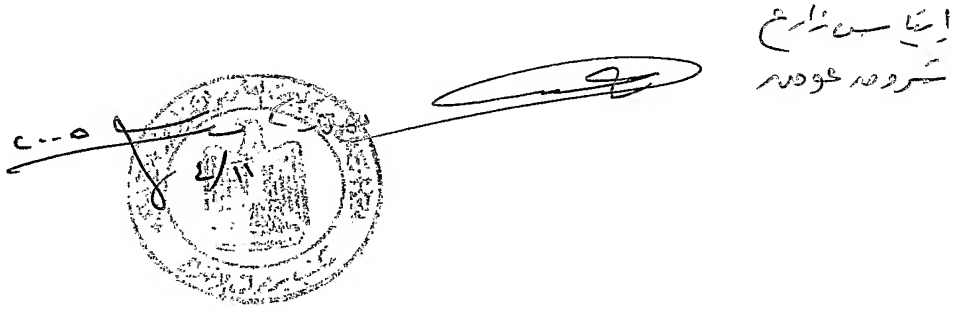
- There is no prior art for therapy of deficiency of the glutathione S transferase enzyme or for deficiency of epoxide hydrolase deficiency in the literature.
- The use of sulfated compounds in medicine is restricted to sulfates and sulfonamides.
- The use of plastic of sulfur did not ever encompass medical interventional material.



This is translation for application No., 1103/2003 filed on 23/12/2003

(2/2) Problem or deficiency with previous art:

- As there is no reported treatment for glutathione S transferase enzyme deficiency or epoxide hydrolase deficiency, there in no defect with already non-existing therapies.
- There was no previous use of elemental inorganic sulfur or its sulfides or any of the compounds or complexes described in this patent.
- The use of sulfates always posed oxidant stress from the SO_n radical with development of lots of side effects.
- There was no interest in industrial application of plastic of sulfur for the manufacturing of medical interventional material



This is translation for application No., 1103/2003 filed on 23/12/2003

(3/2) New with invention:

A. **All described pharmaceutical products described in this patent decrease free oxygen radicals delivered to tissues as a side effect of a medicine.**
B. **Plastic of sulfur has a lesser life time than other plastics where a medical interventional material always has a shelf life with the abilty to "self destroy" of the medical interventional material after a certain amount of time.**
C. **The formation of pharmaceutical products and medical interventional material from the following**

(All entries come in all isomeric structures)

1. The use of elemental Inorganic native sulfur in any of its forms as open or cyclic S_n species, liquid, catenasulfur.

Where $_n$ = 6,7,9-15, 18, and 20, and any other form of elemental inorganic sulfur.

2. A structure having the formula of R- sulfide (R-S),
3. A structure having the formula of R –hydrogen sulfide(R-SH) in inorganic compounds.
4. A structure having the formula of R-thiol (R-SH) in organic compounds,
5. A structure having the formula of Sulfur-R (S-R)
6. A structure having the formula of sulfur nitrogen cations and anions (R-SN)
7. A structure having the formula of disulfide (RSSR).
8. A structure having the formula of R-dithiocarbamate, R-dithiocaboxylate, R-dithiophosphinate, R- thioxanthate, R- trithiocarbonate.
9. A structure having the formula of R-tetrathiometallate.
10. A structure having the formula of R- dithiolenes.
11. A structure having the formula of R-S_2O4 R- dithionite

This is translation for application No., 1103/2003 filed on 23/12/2003

12. A structure having the formula of R- bisulfates
13. A structure having the formula of R-polysulfates
14. A structure having the formula of R - peroxodisulfurate
15. A structure having the formula of R-S_2CH
16. A structure having the formula of R- thiosulfurate i.e. salts of $H_2S_2O_3$
17. A structure having the formula of R-dithionous i.e. salts of $H_2S_2O_4$[b]
18. A structure having the formula of R-disulfurous i.e. salts of $H_2S_2O_5$[b]
19. A structure having the formula of R-dithionate i.e. salts of $H_2S_2O_6$
20. A structure having the formula of R- disulfurate salts of $H_2S_2O_7$
21. A structure having the formula of R-polysulfates
22. A structure having the formula of R- polythionate $R\text{-}S_{n+2}O_6^{2-}$
23. A structure having the formula X-R-S or X*n*-R-S

Where R is independently selected from:

all acid addition sulfides, acid addition hydrogen sulfides, base addition sulfides and hydrogen sulfides).

a. All elements of The Periodic Table of the elements including: Metals, actinide, lanthanides, first, second, and third transition elements series and the halogens (**examples**: all phosphorus sulphides, all potassium sulfides, sulfur chlorides, sulfur amide (S_4N^-) tetrasulfur tetranitride, S_xN_y compounds etc., carbon sulfur complexes).

b. Amino acids (any essential or non- essential), primary amines, secondary amines, tertiary amines, arylamines, heterocyclic amines, aromatic amines, imines, polyimines, macrocyclic amines.

c. Lipoproteins, apolipoproteins, lethicines, eicosanoids, glycolipids, oils, triglycerides

d. Fatty acids, alkanes, alkenes, alkynes, aromatics, alkyl halides, haloalkenes, alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides, nitriles, alkyls, aryls, η^6-arenes, acetylenes and allyls .

e. Isoprenoids, steroids, cholesterol and its biosynthesis steps products.

This is translation for application No., 1103/2003 filed on 23/12/2003

f. Water soluble vitamins and fat soluble vitamins (example: pyridoxin sulfide-thiol, pantothenate sulfide-thiol etc).

g. Casein, olivovitelline

h. Ketones, polyhydroxy aldehydes.

i. D and L Glyceraldhydes, lactic acid, tartaric acid, arabinose

j. Carbohydrates; as Monosaccharides, (including aldehydes, ketones) as trioses, tetroses, pentoses, hexoses, Disaccharides, uronic acids, aric acids, anhydrides, dianhydrides, glycosides, cyclic acetals, aldoses, uloses, aldonic acids,

k. Invert sugars (example; dextrose – sulfide or thiol, levulose- sulfide or thiol, etc)

l. Glycoproteins as glucosamine- sulfide or thiol and glucouronic acid, galactosamine

m. Phosphatidic acids, phosphatidylcholines, phosphatidylethanolamines, Phosphatydylserines, phosphatidylinositols.

n. Hormones and biologic mediators (example: neurotransmitters, adrenalin, amphetamines, dopamine, serotonin, thyroxin).

o. Oligomeric proteins (including angiotensin II, vasopressin, oxytocin, bradykinin, gastrin, substance P, and endothelin, etc)

p. Bulking agents and sclerosing agents (example: for genitourinary system, variceal sclerotherapy.

q. Bile acids and their esters and salts (example: cholic acid, dexoxy cholic acid, taurocholic acid, glycocholic acid, lithocholic acid, chenodeoxy cholic acid etc).

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فاكس : ٧٩٢١٢٧٣ - ٧٩٢١٣٢٥

This is translation for application No., 1103/2003 filed on 23/12/2003

r. Mucopolysaccharides (eg heparn), mucins, proteoglycans, glycosaminoglycans.

s. Xanthines, hypoxanthines, purines, pyrimidines, pyridazine.

t. Cerebrosides, gangliosides, serine, sphingosines, globsides, ceramides

Where X is independently selected from:

a. **Above** mentioned R (eg . salts or complexes of more than one element (eg $Fe_2S_2I_4$, all sulfur iron complexes, metalloborones, metallocarborones)

Examples and not exclusive:

$Mn(S_2CNEt_2)_2$
$Mn(S_2CNR_2)_3$
Chromium thioesters (-[aryl or alkyl $-SCrO_3]^-$
Vanadium Iron Sulfur complexes, $[V(NCS)_6]^{4-}$ salts and thiovandates.
All titanium thiols.
Alkene complexes, alkyne metallocomplexes, enyl and dienyl complexes.
Cheveral phases; ternary molybdenum chalcogenides having a general formula of $M_xMo_6X_8$ where M: Pb, Sn, Cu, Co, Fe, and X may be S, S, or Te.
Organo compounds, alkoxides, carboxylates, and oxosalts.

All examples are merely illustrative and not exclusive

Where the medical interventional material includes all types of;

Where Medical interventional material includes (vascular, cardiologic, endovascular, urologic, hepatic, neurologic, gastrointestinal, cardiothoracic, orthopedic)

i. **Stents, (including endovascular, dilating, urethral, ureteric)**
ii. **Syringes**
iii. **All test tube and lab equipment**

This is translation for application No., 1103/2003 filed on 23/12/2003

iv. Catheters, ---ostomy tubes,
v. Chest tube
vi. Bulking agents (example: for incontinence, reflux, (etc),
vii. Drains, shunts, nerve sheathing material, etc
viii. Tubes (including tracheostomy, grommet, nasogatric tubes)
ix. Drag-net, foreign body grasping capsules, baskets or nets etc.
x. Surgical suture material.
xi. Artificial mesh (example: for hernias, skin, for organ approximation) , bone shaped grafts
xii. Sieves for venous and arterial thrombosis
xiii. Plastic bags for blood, urine, and any biologic material.
xiv. Canulas, central venous pressure devices,
xv. Grafts, (including grafts replacing bone defects and other soft tissue defects post- debulking, or post traumatic or congenital etc.)
xvi. Prosthesis devices (including penile, breast implants, heart valves, etc.).
xvii. Casts, soft and hard,
xviii. Implants (including absorbable implants)
xix. Plates and screws, nails,
xx. Spacers,
xxi. Bone cement.
xxii. Bands for band ligations, and ligations for all medical purposes as fallopian tube ligation, cervical , oeophageal varices etc.
xxiii. Sheaths of endoscopy, bed sheets, thermometers, etc, syringes, milk breast pumps
xxiv. Lubricant medium (example: for catherter introduction, sonar probe-surface contact lubricants, etc.)

This is translation for application No., 1103/2003 filed on 23/12/2003

(4/2) Detailed description:

The detailed description includes the use and formation of the products of inorganic sulfur and all the described compounds and complexes subject of this patent as:

- pharmaceutical products
- medical interventional material

First: the preparation of the pharmaceutical products subject of this current patent;

The pharmaceutical product is formed of X or X_n
The pharmaceutical product is formed of X-Y, or X_n-Y or, X-Y_n, or X_n-Y_n
No pharmaceutical product of Y or Y_n
Final product shape is Z

Where (X) represents any choice from group A
Where (X_n) represents more than a choice from group A
Where (-) represents a method of preparation from group S
Where (Y) represents any choice from group B
Where (Y_n) represents more than a choice from group B
Where (Z) represents any choice from group C

This is translation for application No., 1103/2003 filed on 23/12/2003

Group A

All entries in group A come in all isomeric forms

1. The use of elemental Inorganic native sulfur in any of its forms as open or cyclic S_n species, liquid, catenasulfur.

Where $_n$ = 6,7,9-15, 18, and 20, and any other form of elemental inorganic sulfur.

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11. A structure having the formula of R-S_2O4 R- dithionite
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16. A structure having the formula of R- thiosulfurate i.e. salts of $H_2S_2O_3$
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22. A structure having the formula of R- polythionate R-$S_{n+2}O_6^{2-}$
23. A structure having the formula X-R-S or X*n*-R-S

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This is translation for application No., 1103/2003 filed on 23/12/2003

a. All elements of The Periodic Table of the elements including: Metals, actinide, lanthanides, first, second, and third transition elements series and the halogens **(examples**: all phosphorus sulphides, all potassium sulfides, sulfur chlorides, sulfur amide (S_4N^-) tetrasulfur tetranitride, S_xN_y compounds etc., carbon sulfur complexes).

b. Amino acids (any essential or non- essential), primary amines, secondary amines, tertiary amines, arylamines, heterocyclic amines, aromatic amines, imines, polyimines, macrocyclic amines.

c. Lipoproteins, apolipoproteins, lethicines, eicosanoids, glycolipids, oils, triglycerides

d. Fatty acids, alkanes, alkenes, alkynes, aromatics, alkyl halides, haloalkenes, alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides, nitriles, alkyls, aryls, η^6-arenes, acetylenes and allyls .

e. Isoprenoids, steroids, cholesterol and its biosynthesis steps products.

f. Water soluble vitamins and fat soluble vitamins (example: pyridoxin sulfide-thiol, pantothenate sulfide-thiol etc).

g. Casein, olivovitelline

h. Ketones, polyhydroxy aldehydes.

i. D and L Glyceraldhydes, lactic acid, tartaric acid, arabinose

j. Carbohydrates; as Monosaccharides, (including aldehydes, ketones) as trioses, tetroses, pentoses, hexoses, Disaccharides, uronic acids, aric acids, anhydrides, dianhydrides, glycosides, cyclic acetals, aldoses, uloses, aldonic acids,

k. Invert sugars (example; dextrose – sulfide or thiol, levulose- sulfide or thiol, etc)

This is translation for application No., 1103/2003 filed on 23/12/2003

l. Glycoproteins as glucosamine- sulfide or thiol and glucouronic acid, galactosamine

m. Phosphatidic acids, phosphatidylcholines, phosphatidylethanolamines, Phosphatydylserines, phosphatidylinositols.

n. Hormones and biologic mediators (example: neurotransmitters, adrenalin, amphetamines, dopamine, serotonin, thyroxin).

o. Oligomeric proteins (including angiotensin II, vasopressin, oxytocin, bradykinin, gastrin, substance P, and endothelin, etc)

p. Bulking agents and sclerosing agents (example: for genitourinary system, variceal sclerotherapy.

q. Bile acids and their esters and salts (example: cholic acid, dexoxy cholic acid, taurocholic acid, glycocholic acid, lithocholic acid, chenodeoxy cholic acid etc).

r. Mucopolysaccharides (eg heparn), mucins, proteoglycans, glycosaminoglycans.

s. Xanthines, hypoxanthines, purines, pyrimidines, pyridazine.

t. Cerebrosides, gangliosides, serine, sphingosines, globsides, ceramides

Where X is independently selected from:

b. **Above** mentioned R (eg . salts or complexes of more than one element (eg $Fe_2S_2I_4$, all sulfur iron complexes, metalloborones, metallocarborones)

Examples and not exclusive:

$Mn(S_2CNEt_2)_2$
$Mn(S_2CNR_2)_3$
Chromium thioesters (-[aryl or alkyl--$SCrO_3$]$^-$
Vanadium Iron Sulfur complexes, $[V(NCS)_6]^{--}$ salts and thiovandates.

This is translation for application No., 1103/2003 filed on 23/12/2003

All titanium thiols.
Alkene complexes, alkyne metallocomplexes, enyl and dienyl complexes.
Cheveral phases; ternary molybdenum chalcogenides having a general formula of $M_xMo_6X_8$ where M: Pb, Sn, Cu, Co, Fe, and X may be S, S, or Te.
Organo compounds, alkoxides, carboxylates, and oxosalts.
Distebines (R_2Sb-SbR_2)
Sulfur taurocholate
Potassium dihydrogen sulfide
Sodium lauryl sulfide

All examples are merely illustrative and not exclusive

GROUP B

NO Pharmaceutical Product Is Claimed as Y or Y_n

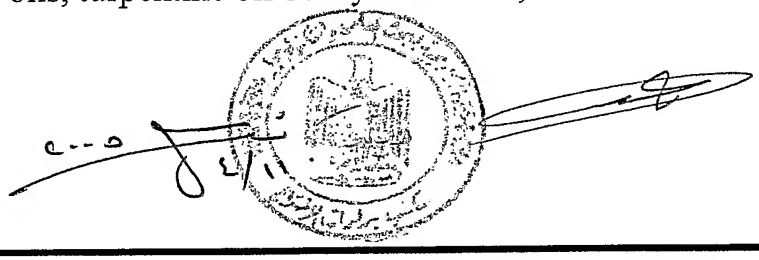
Group B Includes All Types Of The Following Enteries

All types of

a. All Natural honey of all known types, forms, species, concentration, colours and compositions
b. Honey (semisynthetic, synthetic, with any or all additives) of all known types, forms, species, concentration, colours and compositions
c. Molasses of all types, colours, forms, concentration, colours and compositions
d. Jams, marmalade of all known fruits, nuts and vegetables

This is translation for application No., 1103/2003 filed on 23/12/2003

e. All addition salts and bases of all elements of periodic table
f. All organic and inorganic compounds and complexes of elements of periodic table
g. All sulphates, sulphites, and sulphonates of group A mentioned above.
h. All organic and inorganic compounds and complexes of more than one element of the elements of periodic table
i. All known exipients, example: Inert basic (dibasic calcium phosphate, ethyl cellulose, methylacrylate copolymer, polyamide, polyethylene and polyvinyle acetate), Lipid exipients (carnauba wax, cetyl alcohol, hydrogenated vegetable oils, microcrystalline waxes, mono-and triglycerides, PEG monostearate and PEG), Hydrophilic excipients (alginates, carbopol, gelatine, hydroxypropylcellulose, hydroxyl propylemethyl cellulose, polysorbates
j. Matrix delivery systems (example: hydrophilic colloid matrices, lipid matrices and insoluble polymer matrices) as matrix formers (including hydrogenated vegetable oils, soya oil, linseed oil) channelling agent (all exicipients) solublizers and ph modifiers (polyols, surfactants, PEGs) antiadherents/glidants (0.5%-1% for colloidal silicon dioxide etc,) magnesium stearate
k. Solutions of extracts, tinctures, syrups
l. Methylcellulloses, polysaccharides, carbomers (as carboxypolymethylene)
m. Hydrated silicates,
n. Perfumes and aromatic compounds.
o. Diluents
p. Oils, vegetable oils, hydrogenated vegetable oils or not hydrogenated vegetable oils, animal oils and fats, cotton seed oils, safflower oils, turpentine oil benzyl benzoate, and fish oils.



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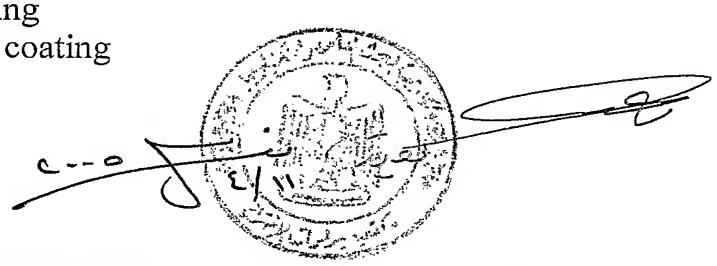
q. Colloids (as xanthan gum, xanthan gum/locust bean gum combination)
r. Gastric retentive material (example: triethanolamine mystristate, propanthelene, barium sulphate)
s. Surfactants (example: anionic surfactants as alkali metals and ammonium salts, amine soaps, sulphated and sulphonated compounds, cationic surfactants as cetrimide, non-ionic surfactants as glycerol esters and glycol, polysorbates, poloxalkols, higher fatty alcohols
t. Lubricants (hydrophobic as magnesium stearate, calcium stearate, stearic acid, hydrophilic as glyceryl palmitostearate, glyceryl benhanate, sodium stearyl fumarate and inorganic lubricants as colloidal silicon dioxide and talc, paraffin, anhydrous lanoline).
u. Disintegrants
v. Viscosity- enhancing agents
w. Binders adhesives
x. Adherents
y. Gliadins
z. Density modifiers as sucrose, dextrose, sorbitol, glycerol
aa. Buffers
bb. Humectants
cc. Antioxidants as butylated hydroxytoluene
dd. Colors and dies (natural and synthetic; as anthocyanines, sodium salts of sulphonic acids, caramel, extracts of beetroot , carotinoids and chlorophyll)
ee. Flavouring agent (salty as;apricot flavour, butterscotch, liquorice, peach and vanilla, bitter; as anise, chocolate, mint, passion fruit, wild cherry, sweet as, fruits and berries, and citrus fruits: liquorice and raspberries, spirits as alcoholic solutions of volatile materials)
ff. Artificial and natural sweeteners
gg. Sugar coating
hh. Chocolate coating



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ii. Film coating
jj. Air suspension
kk. Propellants
ll. Ion exchange resin
mm. Analgesics, astringents
nn. Elixirs, linctuses (example sucrose)
oo. Aromatic waters and spirits (example: peppermint water and anise water)
pp. Complex formation chemicals
qq. All other medicines combinations (example in multivitamin preparations, with iron, with antibiotics , etc)
rr. Liquids for cutaneous application as alcohol, and collodions
ss. Bulk powders (as calcium carbonate and magnesium trisilicate)
tt. Divided powders as sodium bicarbonate, citric acid,
uu. Bulk granules
vv. Divided granules,
ww. Dusting powder
xx. All cellulose compounds
yy. Gelatine
zz. Stabilizers
aaa. Aldoses
bbb. Foods
ccc. Beverages (including milk and artificial milk for all known purposes, all juices or any synthetic beverages)
ddd. All infant foods and formulae for all types of disease and ages and of all specifications
eee. Tonics
fff. All fresh or dried fruits mixtures
ggg. Any known medicine
hhh. Legumes or vegetables dried or fresh
iii. Chocolate, biscuits, cakes, sweets and pastry

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تليفون : ٧٩٢١٢٣٢٣ - ٧٩٢١٣٢٤ - ٧٩٢١٢٩١
فاكس : ٧٩٢١٢٧٣ - ٧٩٢١٣٢٥

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No Pharmaceutical Product Is Claimed as Y or Y_n

Group S
Includes

- preparation Methods
- Dose formulation Method
- Manufacturing Methods

Preparation Methods

Includes all known preparation methods

First. Preparation of the Pharmaceutics subject of this Patent;

- **Amounts of one or more of the chemicals from group A added to amounts of one or more of the chemicals in group B**
- **Amounts of one or more of the chemicals are added from group A to one or more of the chemicals in group A**
- **Amounts of one or more than one chemical from group A to one or more from group B are combined**
- **After combination it becomes homogenous and this homogenous combination is the pharmaceutic product claimed.**

-Where the amounts are calculated on basis of molecular weight, or molar quantities, or molar concentration according to the expected pharamceutic product or any method known for amount calculations.

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-Where the combination method involves all and any known industrial manufacturing method (described later in detail).
-Where the resulting combination has any physical form of liquid, solid, gaseous, vapour and in any particle size as powder or granules.
-Where the homogenous combination represents a pharmaceutical product that has the form or shape of any known medicine in form, concentration or size.

Second. Dose formulation Method

All dose regimens are allowed.
Recommended dose regimens; All pharmaceutical preparations described in this patent come in single and multiple-dose regimens. As elimination time was studied to be around 6-8 hours according to clinical situation where a single dose or multiple doses are required according to final form of slow release or rapidly acting a single dose would range from 30 to 100 mg /kg in adults and children, where a basic adult dose is arithmetically based on 60kg and not 30kg. In regimens of multiple doses where creatinine clearance is normal a dose of 60-200mg/kg/24hours on 2 or 3 or 4 divided doses would be recommended.
Loading doses are allowed with any type of route of delivery. Recommended in this patent: In case of rectal or vaginal suppository, parentral or nebulised or aerosol delivered, rapid action is maintained through a multiple dose regimen of 2 or 3 times/24hours. The recommended dose would be 40-120mg/kg initial loading dose then 30-100mg/kg after 2 hours to be divided over 22 hours reaching a total dose of 70-220mg/kg/24hours.
All described any physical forms and structures of sulfur of cyclic S_n species, liquid, catenasulfur.(***Where*** $_n$ = 6,7,9-15, 18, and 20, and any other form of elemental inorganic sulfur) and all described chemical in this patent and their active biologically transformed ingredients as well

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are eliminated mainly through gastrointestinal tract and to lesser extent through urinary tract and skin. They are used by every cell in the body.

Third. Manufacturing Methods

Using Any And All Known Pharmaceutical Industry Techniques and Equipment

examples

Granulation Methods including dry and wet granulation.
Granulation mechanisms include particle-bonding mechanisms, adhesion and cohesion forces in immobile films, interfacial forces in mobile liquid films, solid bridges, partial melting, crystallization of dissolved substances and attractive forces. Granule formation mechanisms include nucleation, transition, ball growth by coalescence, breakage, abrasion transfer and layering. The process includes wet granulators (shear granulators, high/speed mixer/granulators, fluidized- bed granulators, spray-driers, spheronisers and pelletizers), extrusion/spheronization, dry granulators (sluggers, roller compactors) and Rotor granulation.

Drying (convective, conductive, radiation and freeze drying). The process includes utilization of fixed bed convective drying, dynamic convective driers, vacuum oven and vacuum tumbling drier, use of drum driers, spray driers, microwave or infrared radiation, and various freeze drying techniques.

Tablet manufacturing including direct compaction and tablet production via granulation. Tablet formation steps used include die filling, tablet formation and ejection. It employs table presses in the various forms including eccentric, rotary and computerized hydraulic presses. Formation of all types of tablets. Compaction is also employed. Tablets form used comes in coated and un-coated forms. Coating necessitates

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using of all techniques including film coating, sugar coating, press coating and functional coating (as controlled release coatings, multiparticulate, enteric film and sugar coating).

Capsule manufacturing in all sizes using gelatin, colourants and process aids. All formulations for capsule filling are applied. All soft and hard gel manufacturing processes are used.
All powder manufacturing, aerosol manufacturing, cream manufacturing and trans dermal delivery system pharmaceutical techniques are used. As well as crystallization, adsorption, blending, particle size reduction (by operating crushing) dispersion, sedimentation, fluidization, liquid filteration, staged operations, spinning disc reactors, microencapsulation, emulsion, fusion). All parentral preparation techniques are also used.
All known primitive and industrially new introduced techniques including shaking, moving and all possible industrial and small scale production techniques can be employed.
All known packing systems of final product are used.
Quality control measures are employed in all steps of manufacturing.
All recombinant technology involving bacteria, fungi, viruses and all forms of biological material is also used for industrial scale manufacturing of sulfides of group A (mentioned earlier). All microbiological techniques are used.

All examples are for illustration and are not exclusive

Group C
Final outcome for product Z

The Final Pharmaceutical Product Has
A form
A concentration

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A . The final pharmaceutical product form includes all and any of the shapes of medicine. Included are examples for illustration and are not exclusive.

All known pharmaceutical forms of medicine through oral, rectal, parenteral, dermal, skin, inhalation, gynaecologic, local, genitourinary, haematogenous, intraosseous, eyedrops, for local, intralesional, and systemic use.

Examples;

I. Solution
II. Suspension
III. Emulsion
IV. Granules
V. Crystals
VI. Precipitates
VII. All types tablets (uncoated, coated or enteric coated) as disintegrating, chewable, effervescent, lozenges, sublingual and buccal tablets, extended release (diffusion-controlled release based, dissolution-controlled release based, erosion-controlled based and osmosis-controlled based)
VIII. Suppository (Rectal and vaginal)
IX. Mixed powder
X. Mixture (positive and negative mixtures)
XI. Capsules (hard and soft)
XII. Aerosol product (pulmonary and nasal)
XIII. Controlled release dosage form
XIV. Intralesional preparations
XV. Seclerosing preparations,
XVI. Bulking materials preparations
XVII. Local creams, gels, spraying foam, lotions, patches for dermal delivery

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XVIII. Transdermal therapeutic systems (including: transdermal patches, ointments, powders, gels, pastes, creams, lotions, foam and aerosols,
XIX. Dry powder inhalers
XX. Nasal delivered medicine
XXI. Eye drops and gels and creams and ointments

Examples of Release delivery system dosage forms:

Delayed release
Repeat action
Prolonged action
Sustained release
Extended release
Controlled release
Modified release

B. Final pharmaceutical product concentration.

All described chemicals for pharmaceutical use described in this patent comes in all concentrations ranging from decimal concentration to units and tens. Example: 0.0015%, 0.1%, 3%, 30%, 70% and 100% concentration.

Second: the preparation of the medical interventional material subject of this current patent;

Plastic of sulphur and all the described sulphur compounds described in group A is formed by heating and cooling in the absence of oxidizing agents. The formed plastic can then be shaped in any form or shape. All technologies available for shaping, moulding and structuring

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plastic could be implemented in all known industrial models or any other model in any and all sizes . All interventional medical materials can be manufactured from plastic of sulphur and all its sulphur containing compounds of group A.

All and any medical interventional material and products include;

Where Medical interventional material includes (vascular, cardiologic, endovascular, urologic, hepatic, neurologic, gastrointestinal, cardiothoracic, orthopedic)

i. **Stents having all shapes, diameters, lengths and forms, (including endovascular, dilating, urethral, ureteric)**
ii. **Syringes**
iii. **All test tube and lab equipment**
iv. **Catheters, ---ostomy tubes,**
v. **Chest tube**
vi. **Bulking agents (example: for incontinence, reflux, (etc),**
vii. **Drains, shunts, nerve sheathing material, etc**
viii. **Tubes (including tracheostomy, grommet, nasogatric tubes)**
ix. **Drag-net, foreign body grasping capsules, baskets or nets etc.**
x. **Surgical suture material.**
xi. **Artificial mesh (example: for hernias, skin, for organ approximation) , bone shaped grafts**
xii. **Sieves for venous and arterial thrombosis**
xiii. **Plastic bags for blood, urine, and any biologic material.**
xiv. **Canulas, central venous pressure devices,**
xv. **Grafts, (including grafts replacing bone defects and other soft tissue defects post- debulking, or post traumatic or congenital etc.)**
xvi. **Prosthesis devices (including penile, breast implants, heart valves, etc.).**
xvii. **Casts, soft and hard,**
xviii. **Implants (including absorbable implants)**
xix. **Plates and screws, nails,**
xx. **Spacers,**
xxi. **Bone cement.**

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xxii. **Bands for band ligations, and ligations for all medical purposes as fallopian tube ligation, cervical , oeophageal varices etc.**

xxiii. **Sheaths of endoscopy, bed sheets, thermometers, etc, syringes, milk breast pumps**

xxiv. **Lubricant medium (example: for catherter introduction, sonar probe-surface contact lubricants, etc.)**

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(5/2) Method of exploitation:

- All the described pharmaceutics can be used as any medicine by oral, rectal, application, ingestion, paraentrally , intralesionally, percutaneuosly, local, as sclerosing material for variceal bleeding, bone graft material bulking material, or to replace or fill space as breast augmentation etc.
- All described plastic of sulfur and the related compounds described in group A of previous section of detailed description could be used as suture material, medical surgical interventional material and all medical interventional material especially that they have a shorter shelf life and "self destroying" property.

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Claims

I claim the use of the following medically as medicines & medical interventional material:

First. The pharmaceutical product formed of X or X_n
The pharmaceutical product formed of X-Y, or X_n-Y or, X-Y_n, or X_n-Y_n
No pharmaceutical product of Y or Y_n
Final product shape is Z

Second. According to first claim; Where (X) represents any choice from group A

Third. According to first claim ;Where (X_n) represents more than a choice from group A

Fourth. According to first claim; Where (-) represents a method of preparation from group S

Fifth. According to first claim; Where (Y) represents any choice from group B

Sixth. According to first claim; Where (Y_n) represents more than a choice from group B

Seventh. According to first claim; Where (Z) represents any choice from group C

Eighth. According to first claim; All described chemicals for pharmaceutical use described in this patent comes in all concentrations ranging from decimal concentration to units and tens. Example: 0.0015%, 0.1%, 3%, 30%, 70% and 100% concentration.

Ninth. According to first claim; all plastic of described products formed of X or X_n. The products formed of X-Y, or X_n-Y or, X-Y_n, or X_n-Y_n but not of product of Y or Y_n would be used as their plastics as presented in group D.

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Group A

All entries In Group (A) Come In All Isomeric Forms

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1. The use of elemental Inorganic native sulfur in any of its forms as open or cyclic S_n species, liquid, catenasulfur.

Where $_n$ = 6,7,9-15, 18, and 20, and any other form of elemental inorganic sulfur.

2. A structure having the formula of R- sulfide (R-S),
3. A structure having the formula of R –hydrogen sulfide(R-SH) in inorganic compounds.
4. A structure having the formula of R-thiol (R-SH) in organic compounds,
5. A structure having the formula of Sulfur-R (S-R)
6. A structure having the formula of sulfur nitrogen cations and anions (R-SN)
7. A structure having the formula of disulfide (RSSR).
8. A structure having the formula of R-dithiocarbamate, R-dithiocaboxylate, R-dithiophosphinate, R- thioxanthate, R- trithiocarbonate.
9. A structure having the formula of R-tetrathiometallate.
10. A structure having the formula of R- dithiolenes.
11. A structure having the formula of R-S_2O4 R- dithionite
12. A structure having the formula of R- bisulfates
13. A structure having the formula of R-polysulfates
14. A structure having the formula of R - peroxodisulfurate
15. A structure having the formula of R-S_2CH
16. A structure having the formula of R- thiosulfurate i.e. salts of $H_2S_2O_3$
17. A structure having the formula of R-dithionous i.e. salts of $H_2S_2O_4$[b]
18. A structure having the formula of R-disulfurous i.e. salts of $H_2S_2O_5$[b]
19. A structure having the formula of R-dithionate i.e. salts of $H_2S_2O_6$
20. A structure having the formula of R- disulfurate salts of $H_2S_2O_7$
21. A structure having the formula of R-polysulfates
22. A structure having the formula of R- polythionate R-$S_{n+2}O_6^{2-}$
23. A structure having the formula X-R-S or X*n*-R-S

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Where R is independently selected from:
all acid addition sulfides, acid addition hydrogen sulfides, base addition sulfides and hydrogen sulfides).

a. All elements of The Periodic Table of the elements including: Metals, actinide, lanthanides, first, second, and third transition elements series and the halogens **(examples**: all phosphorus sulphides, all potassium sulfides, sulfur chlorides, sulfur amide (S_4N^-) tetrasulfur tetranitride, S_xN_y compounds etc., carbon sulfur complexes).

b. Amino acids (any essential or non- essential), primary amines, secondary amines, tertiary amines, arylamines, heterocyclic amines, aromatic amines, imines, polyimines, macrocyclic amines.

c. Lipoproteins, apolipoproteins, lethicines, eicosanoids, glycolipids, oils, triglycerides

d. Fatty acids, alkanes, alkenes, alkynes, aromatics, alkyl halides, haloalkenes, alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides, nitriles, alkyls, aryls, η^6-arenes, acetylenes and allyls .

e. Isoprenoids, steroids, cholesterol and its biosynthesis steps products.

f. Water soluble vitamins and fat soluble vitamins (example: pyridoxin sulfide-thiol, pantothenate sulfide-thiol etc).

g. Casein, olivovitelline

h. Ketones, polyhydroxy aldehydes.

i. D and L Glyceraldhydes, lactic acid, tartaric acid, arabinose

j. Carbohydrates; as Monosaccharides, (including aldehydes, ketones) as trioses, tetroses, pentoses, hexoses, Disaccharides, uronic acids, aric acids, anhydrides, dianhydrides, glycosides, cyclic acetals, aldoses, uloses, aldonic acids,

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k. Invert sugars (example; dextrose – sulfide or thiol, levulose- sulfide or thiol, etc)

l. Glycoproteins as glucosamine- sulfide or thiol and glucouronic acid, galactosamine

m. Phosphatidic acids, phosphatidylcholines, phosphatidylethanolamines, Phosphatydylserines, phosphatidylinositols.

n. Hormones and biologic mediators (example: neurotransmitters, adrenalin, amphetamines, dopamine, serotonin, thyroxin).

o. Oligomeric proteins (including angiotensin II, vasopressin, oxytocin, bradykinin, gastrin, substance P, and endothelin, etc)

p. Bulking agents and sclerosing agents (example: for genitourinary system, variceal sclerotherapy.

q. Bile acids and their esters and salts (example: cholic acid, dexoxy cholic acid, taurocholic acid, glycocholic acid, lithocholic acid, chenodeoxy cholic acid etc).

r. Mucopolysaccharides (eg heparn), mucins, proteoglycans, glycosaminoglycans.

s. Xanthines, hypoxanthines, purines, pyrimidines, pyridazine.

t. Cerebrosides, gangliosides, serine, sphingosines, globsides, ceramides

Where X is independently selected from:

c. **Above** mentioned R (eg . salts or complexes of more than one element (eg $Fe_2S_2I_4$, all sulfur iron complexes, metalloborones, metallocarborones)

Examples and not exclusive:

$Mn(S_2CNEt_2)_2$

$Mn(S_2CNR_2)_3$

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Chromium thioesters (-[aryl or alkyl $-SCrO_3]^-$
Vanadium Iron Sulfur complexes, $[V(NCS)_6]^{4-}$ salts and thiovandates.
All titanium thiols.
Alkene complexes, alkyne metallocomplexes, enyl and dienyl complexes.
Cheveral phases; ternary molybdenum chalcogenides having a general formula of $M_xMo_6X_8$ where M: Pb, Sn, Cu, Co, Fe, and X may be S, S, or Te.
Organo compounds, alkoxides, carboxylates, and oxosalts.

All examples are merely illustrative and not exclusive

Group B

No Pharmaceutical Product Is Claimed as Y or Y_n

Group B Includes All Types of The Following Enteries

All types of

1. All Natural honey of all known types, forms, species, concentration, colours and compositions
2. Honey (semisynthetic, synthetic, with any or all additives) of all known types, forms, species, concentration, colours and compositions
3. Molasses of all types, colours, forms, concentration, colours and compositions
4. Jams, marmalade of all known fruits, nuts and vegetables
5. All addition salts and bases of all elements of periodic table
6.

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7. All organic and inorganic compounds and complexes of elements of periodic table
8. All sulphates, sulphites, and sulphonates of group A mentioned above.
9. All organic and inorganic compounds and complexes of more than one element of the elements of periodic table
10. All known exipients, example: Inert basic (dibasic calcium phosphate, ethyl cellulose, methylacrylate copolymer, polyamide, polyethylene and polyvinyle acetate), Lipid exipients (carnauba wax, cetyl alcohol, hydrogenated vegetable oils, microcrystalline waxes, mono-and triglycerides, PEG monostearate and PEG), Hydrophilic excipients (alginates, carbopol, gelatine, hydroxypropylcellulose, hydroxyl propylemethyl cellulose, polysorbates
11. Matrix delivery systems (example: hydrophilic colloid matrices, lipid matrices and insoluble polymer matrices) as matrix formers (including hydrogenated vegetable oils, soya oil, linseed oil) channelling agent (all exicipients) solublizers and ph modifiers (polyols, surfactants, PEGs) antiadherents/glidants (0.5%-1% for colloidal silicon dioxide etc,) magnesium stearate
12. Solutions of extracts, tinctures, syrups
13. Methylcellulloses, polysaccharides, carbomers (as carboxypolymethylene)
14. Hydrated silicates,
15. Perfumes and aromatic compounds.
16. Diluents
17. Oils, vegetable oils, hydrogenated vegetable oils or not hydrogenated vegetable oils, animal oils and fats, cotton seed oils, safflower oils, turpentine oil benzyl benzoate, and fish oils.
18. Colloids (as xanthan gum, xanthan gum/locust bean gum combination)
19. Gastric retentive material (example: triethanolamine mystristate, propanthelene, barium sulphate)
20. Surfactants (example: anionic surfactants as alkali metals and ammonium salts, amine soaps, sulphated and sulphonated compounds, cationic surfactants as cetrimide, non-ionic surfactants as glycerol esters and glycol, polysorbates, poloxalkols, higher fatty alcohols
21. Lubricants (hydrophobic as magnesium stearate, calcium stearate, stearic acid, hydrophilic as glyceryl palmitostearate, glyceryl benhanate, sodium stearyl fumarate and inorganic lubricants as colloidal silicon dioxide and talc, paraffin, anhydrous lanoline).
22. Disintegrants
23. Viscosity- enhancing agents

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24. Binders adhesives
25. Adherents
26. Gliadins
27. Density modifiers as sucrose, dextrose, sorbitol, glycerol
28. Buffers
29. Humectants
30. Antioxidants as butylated hydroxytoluene
31. Colors and dies (natural and synthetic; as anthocyanines, sodium salts of sulphonic acids, caramel, extracts of beetroot , carotinoids and chlorophyll)
32. Flavouring agent (salty as;apricot flavour, butterscotch, liquorice, peach and vanilla, bitter; as anise, chocolate, mint, passion fruit, wild cherry, sweet as, fruits and berries, and citrus fruits: liquorice and raspberries, spirits as alcoholic solutions of volatile materials)
33. Artificial and natural sweeteners
34. Sugar coating
35. Chocolate coating
36. Film coating
37. Air suspension
38. Propellants
39. Ion exchange resin
40. Analgesics, astringents
41. Elixirs, linctuses (example sucrose)
42. Aromatic waters and spirits (example: peppermint water and anise water)
43. Complex formation chemicals
44. All other medicines combinations (example in multivitamin preparations, with iron, with antibiotics , etc)
45. Liquids for cutaneous application as alcohol, and collodions
46. Bulk powders (as calcium carbonate and magnesium trisilicate)
47. Divided powders as sodium bicarbonate, citric acid,
48. Bulk granules
49. Divided granules,
50. Dusting powder
51. All cellulose compounds
52. Gelatine
53. Stabilizers
54. Aldoses
55. Foods

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56. Beverages (including milk and artificial milk for all known purposes, all juices or any synthetic beverages)
57. All infant foods and formulae for all types of disease and ages and of all specifications
58. Tonics
59. All fresh or dried fruits mixtures
60. Any known medicine
61. Legumes or vegetables dried or fresh
62. Chocolate, biscuits, cakes, sweets and pastry

No Pharmaceutical Product Is Claimed As Y or Y_n

Group C
Final outcome for product Z

All known pharmaceutical forms of medicine through oral, rectal, parenteral, dermal, skin, inhalation, gynaecologic, local, genitourinary, haematogenous, intraosseous, eyedrops, for local, intralesional, and systemic use.

Examples;

I. Solution
II. Suspension
III. Emulsion
IV. Granules
V. Crystals
VI. Precipitates
VII. All types tablets (uncoated, coated or enteric coated) as disintegrating, chewable, effervescent, lozenges, sublingual and buccal tablets, extended release (diffusion-controlled release based, dissolution-controlled release based, erosion-controlled based and osmosis-controlled based)
VIII. Suppository (Rectal and vaginal)
IX. Mixed powder
X. Mixture (positive and negative mixtures)
XI. Capsules (hard and soft)
XII. Aerosol product (pulmonary and nasal)

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XIII. Controlled release dosage form
XIV. Intralesional preparations
XV. Seclerosing preparations,
XVI. Bulking materials preparations
XVII. Local creams, gels, spraying foam, lotions, patches for dermal delivery
XVIII. Transdermal therapeutic systems (including: transdermal patches, ointments, powders, gels, pastes, creams, lotions, foam and aerosols,
XIX. Dry powder inhalers
XX. Nasal delivered medicine
XXI. Eye drops and gels and creams and ointments

Examples of Release delivery system dosage forms:

Delayed release
Repeat action
Prolonged action
Sustained release
Extended release
Controlled release
Modified release

Group D

All and any medical interventional material and products include;

Where Medical interventional material includes (vascular, cardiologic, endovascular, urologic, hepatic, neurologic, gastrointestinal, cardiothoracic, orthopedic)

i. **Stents having all shapes, diameters, lengths and forms, (including endovascular, dilating, urethral, ureteric)**
ii. **Syringes**
iii. **All test tube and lab equipment**
iv. **Catheters, ---ostomy tubes,**
v. **Chest tubes , masks, ventilatory support devices.**

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vi. Bulking agents (example: for incontinence, reflux, (etc),
vii. Drains, shunts, nerve sheathing material, etc
viii. Tubes (including tracheostomy, grommet, nasogatric tubes)
ix. Drag-net, foreign body grasping capsules, baskets or nets etc.
x. Surgical suture material.
xi. Artificial mesh (example: for hernias, skin, for organ approximation) , bone shaped grafts
xii. Sieves for venous and arterial thrombosis
xiii. Plastic bags for blood, urine, and any biologic material.
xiv. Canulas, central venous pressure devices,
xv. Grafts, (including grafts replacing bone defects and other soft tissue defects post- debulking, or post traumatic or congenital etc.)
xvi. Prosthesis devices (including penile, breast implants, heart valves, etc.).
xvii. Casts, soft and hard,
xviii. Implants (including absorbable implants)
xix. Plates and screws, nails,
xx. Spacers,
xxi. Bone cement.
xxii. Bands for band ligations, and ligations for all medical purposes as fallopian tube ligation, cervical , oeophageal varices etc.
xxiii. Sheaths of endoscopy, bed sheets, thermometers, etc, syringes, milk breast pumps
xxiv. Lubricant medium (example: for catherter introduction, sonar probe-surface contact lubricants, etc.)